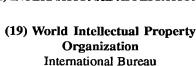
## WO 2004/005467 A2



SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

### Published:

 without international search report and to be republished upon receipt of that report For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.







(43) International Publication Date 15 January 2004 (15.01.2004)

PCT

## (10) International Publication Number WO 2004/005467 A3

- (51) International Patent Classification7: C12N 15/82, 15/87, 15/09, 15/63, A61K 38/28, 38/00, C07K 1/00
- (21) International Application Number:

PCT/US2003/020869

- (22) International Filing Date: 2 July 2003 (02.07.2003)
- (25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 60/393,438

3 July 2002 (03.07.2002)

- (71) Applicant (for all designated States except US): UNI-VERSITY OF CENTRAL FLORIDA [US/US]; Office of Technology Transfer, 4000 Central Florida Boulevard, Orlando, FL 32816-0150 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): DANIELL, Henry [US/US]; 1440 Pelican Bay Trail, Winter Park, FL 32792 (US).
- (74) Agents: CHRISTENBURY, T., Daniel et al.; Piper Rudnick LLP, 3400 Two Logan Square, 18th and Arch Streets, Philadelphia, PA 19103-2762 (US).

- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

#### **Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report: 8 April 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

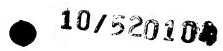
(54) Title: EXPRESSION OF HUMAN INTERFERON IN TRANSGENIC CHLOROPLASTS

(57) Abstract: A plastid transformation vector for a stably transforming a plastid genome is provided. The vector includes, as operably-linked components, a first flanking sequence, a DNA sequence coding for a therapeutic human IFN, which is capable of expression in the plastid and a second flanking sequence. The invention also provides isolated and purified IFN, wherein the IFN is configured in a monomeric or multimeric form and is a structural equivalent to orally administered human IFN. Also provided are methods for variable-expressing biopharmaceutical proteins in plants suitable for mammal consumption. The method includes integrating a plastid transformation vector into a plastid genome of a plant cell; growing the plant cell to express a biopharmaceutical protein, such as therapeutic human interferon IFN. Also disclosed are plants transformed with the aforementioned vectors, and the progeny thereof. Also, disclosed is the IFN, which is IFNα2b.









# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/20869

A. CLASSIFICATION OF SUBJECT MATTER					
IPC(7) : C12N 15/82, 15/87, 15/09, 15/63; A61K 38/28, 38/00; C07K 1/00					
US CL : 800/278, 317.3; 435/320.1, 468; 514/3; 530/344					
According to International Patent Classification (IPC) or to both national classification and IPC					
B. FIELDS SEARCHED					
Minimum documentation searched (classification system followed by classification symbols)					
U.S.: 800/278, 317.3; 435/320.1, 468; 514/3; 530/344					
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched					
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)					
STN, EAST: search terms: interferon, plastid, chloroplast					
C. DOCUMENTS CONSIDERED TO BE RELEVANT					
Category *	* Citation of document, with indication, where appropriate, of the relevant passages			Relevant to claim No.	
X, E	US 2003/0204864 A1 (DANIELL) 30 October 2003 (30.10.2003), pp. 21-22, paragraphs 1-53			1-53	
	0171-0174. p. 26, paragraphs 0212-0213, pp. 26-29, paragraphs 0219-0241.				
A	US 6,512,162 B2 (MCBRIDE et al.) 28 January 2003 (28.01.2003).			1-53	
٠.					
			i		
	•				
			·		
	·				
			į		
			·		
Further	documents are listed in the continuation of Box C.		See patent family annex.		
* S	pecial categories of cited documents:	"T"	later document published after the inte	rnational filing date or priority	
#A" document	defining the general state of the art which is not considered to be		date and not in conflict with the applic principle or theory underlying the inve		
of particular relevance					
"E" earlier ap	"E" earlier application or patent published on or after the international filing date		document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step		
•			when the document is taken alone	·	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)		"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination		
"O" document	referring to an oral disclosure, use, exhibition or other means		being obvious to a person skilled in the		
		H 0. 11	document member of the came natent	family	
"P" document published prior to the international filing date but later than the . "&" document member of the same patent family priority date claimed					
Date of the actual completion of the international search  Date of mailing of the international search report					
			10 FEB 2004		
09 January 2004 (09.01.2004)					
			Authorized officer Bell-Harry Av		
Mail Stop PCT, Attn: ISA/US Commissioner for Patents		James Andres			
P.O. Box 1450			Telephone No. 703-308-0196		
Alexandria, Virginia 22313-1450  Facsimile No. (703)305-3230					
Lacounité Mo	1 desimile 110. (100/003-3230				